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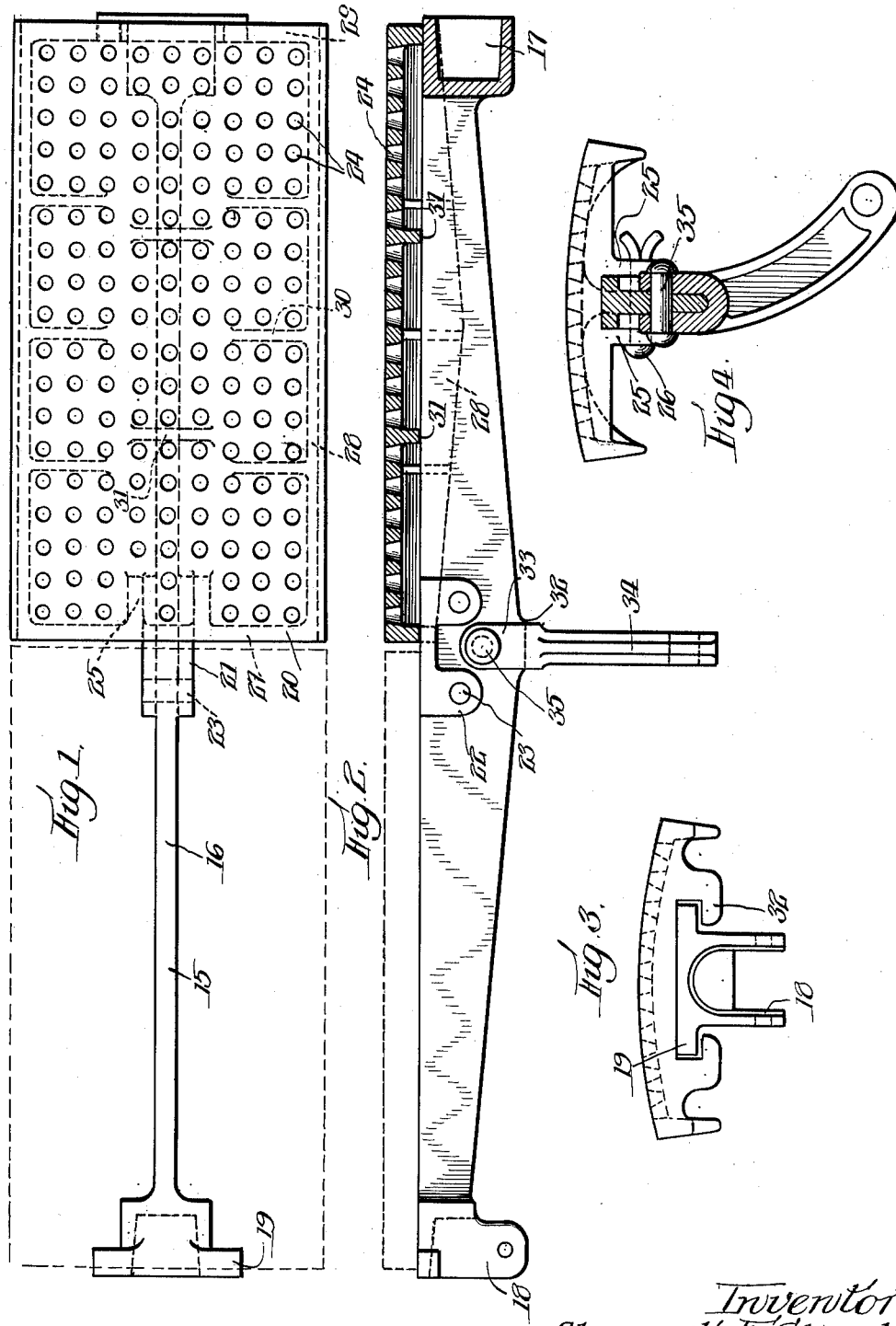
C. F. STREET

1,913,010

GRATE ASSEMBLY

Filed Feb. 21, 1929

2 Sheets-Sheet 1



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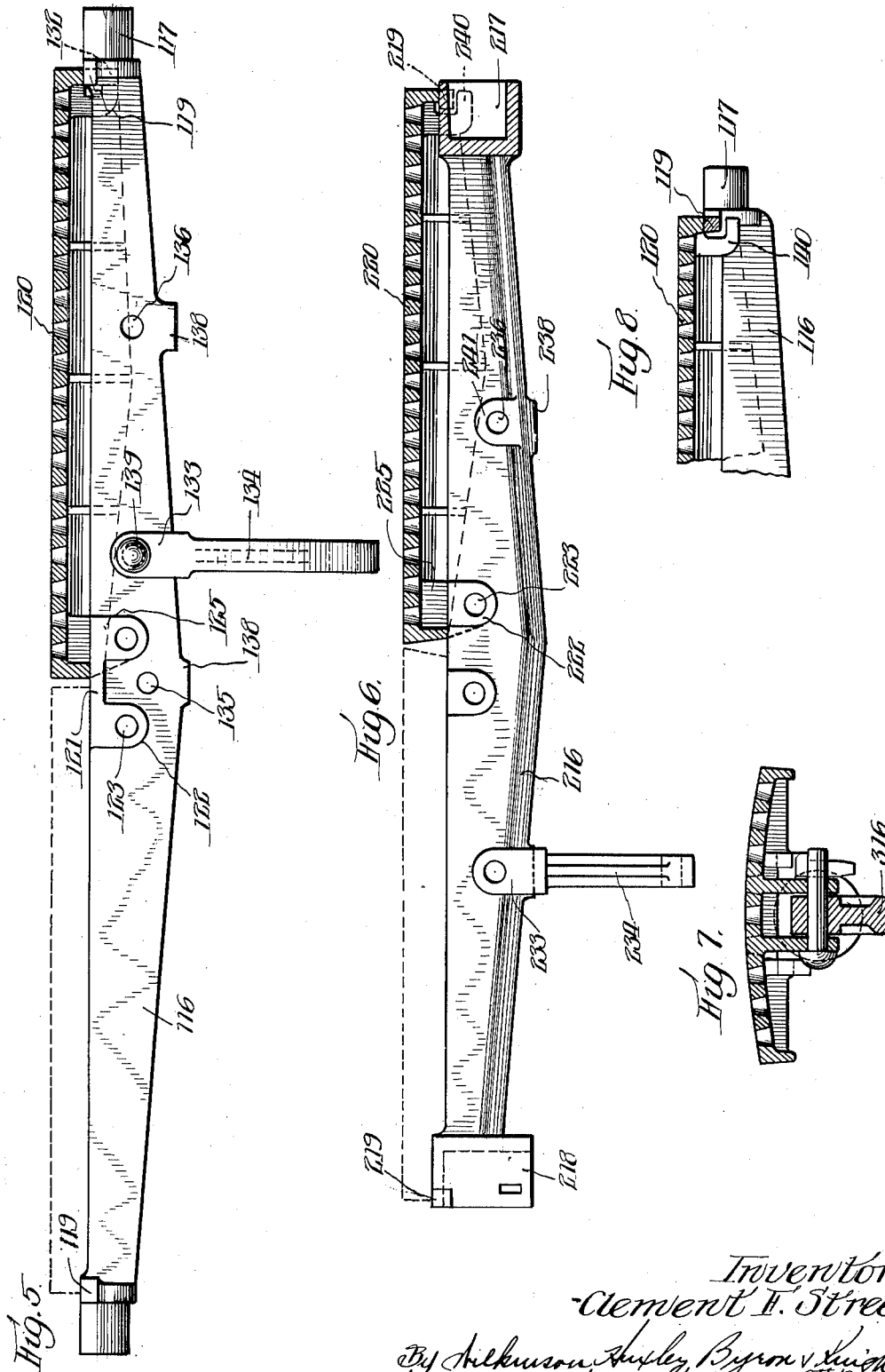
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GRATE ASSEMBLY

Application filed February 21, 1929. Serial No. 341,683.

This invention pertains to grates, and more particularly to the multiple grate assemblies used on locomotives.

Locomotive grates are usually of the rocking type and it is common practice to shake them at frequent intervals while the locomotive is running. This is required for the reason that the coal commonly used leaves a heavy ash and clinkers between the burning coal and the grates, and if this is not removed, it will retard the flow to the fire of the air required for combustion. But there is a wide variation in the character of the coal used on locomotives, and while some of it when burning leaves a heavy ash and clinkers, other leaves a very light ash and few clinkers, if any.

It is common practice to use a drop grate in combination with a set of rocking grates, and this drop grate is operated by means of a set of levers which are handled from the ground. They can therefore be used only when the locomotive is standing.

This drop grate is pivoted near one side and is very different in construction from either the non-rocking type or from the rocking type shown in the construction herewith, and should not be confused therewith.

Grates of this type when used in this service are subject to a high degree of heat on their upper surface while the lower parts are immersed in a continuous flow of cold air. The different parts are therefore subject to different amounts of expansion and contraction, and an object of this invention is to provide a construction in which this will not result in warping and distortion of the parts of the assembly.

Another object of this invention is to provide a grate assembly which is inexpensive to build and maintain and one which fulfills all requirements for economic operation and maintenance.

Still another object is to provide a grate bar assembly which permits rapid cleaning of the fire and changes of the grate bars.

Yet another object is to provide a grate bar assembly which resists distortion, is readily removable and is capable of rapid

conversion to provide different drafts to accommodate different fuels.

A further object is to provide a grate assembly wherein the grate members are secured to their supports by a minimum of parts, yet one which is so constructed that the grate members will be effectively and securely kept in place.

Still a further object is to provide a grate assembly which offers substantially no resistance to expansion and contraction yet at the same time is fixedly supported and effectively resists warping and twisting.

Yet a further object is to provide a grate assembly wherein the securing members between parts are reduced to a minimum, and wherein the clearances are predetermined and arranged to permit ease of operation and assemblage.

With these and various other objects in view, the invention may consist of certain novel features of construction and operation, as will be more fully described and particularly pointed out in the specification, drawings and claims appended hereto.

In the drawings, which illustrate an embodiment of the device and wherein like reference characters are used to designate like parts—

Figure 1 is a top plan view, showing the supporting relation of the grate frame to one of the grate plate members;

Figure 2 is a side elevation, partly in section, of the assemblage illustrated in Figure 1; the position occupied by the grate member completing the assembly being indicated in dotted lines;

Figure 3 is an end elevation of the grate assembly, the same being taken from the end of the grate frame provided with the trunnion;

Figure 4 is a cross section of the grate frame assembly illustrated in Figure 2, showing the relation of the shaker arm to the remainder of the assembly;

Figure 5 is a side elevation, partly in section, of a modified form of grate assembly, the position occupied by the grate member completing the assembly being indicated in dotted lines;

Figure 6 is a side elevation, partly in section, of still another modified form of grate assembly;

Figure 7 is a cross sectional view of the grate assembly illustrated in Figure 6; and

Figure 8 is a fragmentary side elevation, partly in section, of a modified form of securing means provided on the plate grate of the modified assembly illustrated in Figure 5.

Referring first of all to the modification shown in Figures 1 to 4 inclusive, the supporting frame 15 of the grate assembly consists essentially of a single longitudinal rib 16 provided at one end thereof with a trunnion socket 17 and at the other end thereof with a horseshoe or U-shaped trunnion socket 18, each of said sockets being provided with outstanding lug members 19 provided for locking purposes in a manner to be later described. It will of course be understood that the frame may be of any length to accommodate any size or any number of plate grates, the embodiment illustrated being for an assembly including two of such plate grates 20. The supporting frame is provided with an enlarged portion 21 adjacent the center thereof, said portion having downwardly extending bosses 22, the said bosses being provided with apertures 23. The grate plates 20 may be either of the arcuate or flat type provided with suitably disposed apertures 24, said apertures being of a size and spacing for proper draft purposes.

The plates 20 adjacent their inner or in-board end are provided with downwardly extending lugs 25 adapted to straddle the rib 16 and the bosses 22, said lugs being provided with aligned apertures adapted to register with the aperture 23 for the reception of a locking pin 26 for securing said plate grate to the support. The lugs 25 merge into and are integral with the plate and also with a reinforcing rib 27 formed on the inner end of the plate, said rib merging into and being integral with the longitudinal ribs 28 which in turn merge into and are integral with a rib 29 formed on the outer end of said plate. Ribs 28 are preferably made deeper adjacent their centers than at their ends for the purpose of preventing the plate from sagging as a result of service, and to prevent said ribs from bowing outwardly, a series of local cross-ribs 30 is provided which ribs are integral with said ribs and merge into the plate.

In service, it has been found that under heat the ends of the plate will go up or the center will go down, so in order to prevent either one or both of these movements, local ribs 31 are provided suitably spaced and preferably in between or in staggered position with respect to the ribs 30, said ribs contacting with the longitudinal rib 16

of the frame. The inner end of the plate of course is restrained from going up by the pin 26, and the outer end is restrained from going up by providing the depending flange 29 with inwardly extending hooks 32 adapted to have locking engagement with the lugs 19. The frame may be suitably apertured at any place along its length, shown adjacent the center thereof, and may be provided with a guiding boss 38 adapted to cooperate with a portion of the jaws 33 of the shaker arm 34 secured by means of a rivet or lock connection 35 to said frame.

The structure is assembled with sufficient lost motion between the parts to allow them to go together easily and of course the first effect of warping will be to take up this lost motion and bring all the parts firmly in contact. After this has occurred, any further movement will be resisted by the vertical strength of the frame. In assembling the parts of the device, it is only necessary to slip the hooks 32 into engagement with the lugs 19, dropping the plate into place whereby the lugs 25 straddle the frame and the apertures in lugs 25 register with the aperture 23 provided in the bosses 22 whereupon the locking member 26 may be put in place. The adjacent grate plate may likewise be put in place, there being sufficient clearance for the parts to permit their ready assemblage.

Referring now more particularly to the form of the device illustrated in Figure 5, the longitudinal frame 116 is provided with trunnions 117 at each end thereof and outwardly extending lugs 119 are formed on said frame adjacent said trunnions. The plate grates 120 may be of the same construction as has been already described with respect to grate plate 20, the transverse hook members 132 being provided for cooperation with the lugs 119 for locking one end of the plate grate in operative position. As before, the longitudinal member is provided with an enlarged portion 121 provided with bosses 122 having apertures 123 therein for the reception of locking members cooperating with the depending lugs 125 provided on the grate plates. The longitudinal frame member may be provided at convenient places along its length with apertures 135 and 136 having bosses 137 and 138 disposed adjacent thereto for cooperation with parts of the shaker arm 134 to maintain the same in substantially fixed position with respect to said frame members, said shaker arm being provided with jaws 133 having apertures therein adapted to receive the locking member 139.

In the modification illustrated in Figure 8, the frame member 116 is provided with a trunnion 117 and outwardly extending lugs 119. The grate plate 120 is suitably supported on said frame but is provided

with longitudinally extending hooks 140 adapted to cooperate with the lugs 119 to maintain the outer end of the grate plate in its operative position with respect to said frame.

Referring now more particularly to the modification illustrated in Figures 6 and 7, the longitudinal frame member 216 is provided at one end with a trunnion socket 217 and at the other end with the U-shaped trunnion 218. The frame member 216 is deeper adjacent the center thereof as is the case in the modifications already described, and this member may also be of substantially truss formation, as illustrated in Figure 7, that is, it is provided with an enlarged rib or bulbous portion 316 provided along the lower edge thereof. Outwardly extending lugs 219 are provided adjacent the trunnions and are adapted to provide cooperating locking relation with the longitudinal hook members 240 provided on the plate grate 220. The grate plate is provided with reinforcing flanges, as before described, the inner flange thereof being provided with depending lugs 225 provided with aligned apertures adapted to cooperate with apertures 223 provided in the lugs 222 formed on the longitudinal supporting member 216. Bosses 241 may also be provided on the supporting member adjacent suitably spaced apertures 236, said apertures being for the reception of securing means passing through the upstanding jaws 233 of the shaker arm 234, the longitudinal frame member being further provided with bosses 238 cooperating with the shaker arms to maintain the same in fixed position with respect to said frame.

The operation and assemblage of the modified forms are substantially the same as has already been described with respect to the first modification, and it is to be understood that I do not wish to be limited by the exact embodiment of the device shown, which is merely by way of illustration and not limitation, as various and other forms of the device will of course be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a grate assembly, the combination of a support, a grate member secured thereto, said member having staggered reinforcements thereon, certain of said reinforcements having contacting relation to said support.

2. In a grate assembly, the combination of a support, a grate member secured thereto, said member having reinforcements disposed at the sides and center thereof, the reinforcements at the center being in staggered relation to the reinforcements at the

sides, said center reinforcements having contacting relation to said support.

3. In a grate assembly, the combination of a support having securing means thereon, a grate member carried by said support and having securing means at each end thereof adapted to cooperate with said first named securing means for fastening said grate member to said support, and reinforcing ribs disposed on said grate member and contacting with said support to prevent distortion of said grate member.

4. In a grate assembly, the combination of a support having securing means thereon, a grate member carried by said support and having a marginal reinforcement thereon, securing means at each end of said member adapted to cooperate with said first named securing means for fastening said grate member to said support, reinforcing ribs disposed on said grate member and integral with said marginal reinforcement to prevent distortion of the latter, and center reinforcing ribs disposed on said grate member and contacting said support to prevent distortion of said grate member.

5. In a grate assembly, the combination of a support having securing means thereon, a grate member carried by said support and having a marginal reinforcement thereon, securing means at each end of said member, certain of said means being integral with said marginal reinforcement, said last named securing means being adapted to cooperate with securing means on the support for fastening said grate member to said support, and reinforcing ribs disposed on said grate member and integral with said marginal reinforcement to prevent distortion of the latter.

6. In a grate assembly, the combination of a support having securing means thereon, a grate member carried by said support and having securing means at each end thereof adapted to cooperate with the securing means on the support for fastening said grate member to said support, one of said securing means including members disposed transversely of said grate member, and reinforcing ribs disposed on said grate member and contacting said support to prevent distortion of said grate member.

7. In a grate assembly, the combination of a support having securing means thereon, a grate member carried by said support and having securing means at each end thereof adapted to cooperate with the securing means on the support for fastening said grate member to said support, reinforcing ribs disposed on said grate member and contacting said support to prevent distortion of said grate member, and bosses and fastening means on said support for cooperation with shaking means for moving said assembly.

8. As an article of manufacture, a plate grate having marginal flanges, reinforcing means on said grate and integral with certain of said flanges to prevent distortion of said flanges, and fastening means on said grate integral with other of said flanges, certain of said fastening means including facing hook members.

9. As an article of manufacture, a plate grate having marginal flanges, reinforcing means on said grate and integral with certain of said flanges to prevent distortion of said flanges, reinforcing means adjacent the longitudinal center line of said grate and in staggered relation to said first named reinforcing means, and fastening means on said grate integral with other of said flanges, certain of said fastening means including facing hook members.

Signed at Chicago, Illinois, this 14th day of February, 1929.

CLEMENT F. STREET.

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